

Flight Scientist Report  
Friday 5/21/2021 ACTIVATE RF71

Flight Type: Statistical Survey Flight  
Flight Route: ATLIC-ZIBUT-STOOG-ZIBUT-ATLIC  
Special Notes: Evidence of smoke aloft

**King Air**

Pilot report (Wusk): Takeoff 1314 L

Land 1634 L

3.3 hours

Science flight for the UC-12 in support of ACTIVATE, conducted cooperatively with the HU-25. Second flight of a planned two-flight day. Departed Rwy08 to ATLIC climbing to FL280. Flew planned route ATLIC-ZIBUT-STOOG-ZIBUT-ATLIC, with the inflight addition of YAALE between STOOG and ZIBUT on the return. Winds were out of the northeast at ~40kts. Aircraft geolocation was within ~20 nmi throughout the flight, and generally within ~10 nmi during the return westbound leg. All objectives were achieved with one aircraft system discrepancies noted. During the flight the generator loading would change from a balanced load to a split of ~25% on the left and ~65% on the right. This condition existed off and on for about half the flight. Specs call for the loads to be within 10% of each other. Mx will evaluate on Monday.

Crew was Thorson, Wusk, Seaman.

Flight scientist report (Seaman):

**Flight number:** RF071 (sortie # 2 of 5/21/2021) on the UC12 was a statistical survey joint flight with the HU25 Falcon.

**Flight plan:** KLF1 to ZIBUT to STOOG to YAALE to ZIBUT to KLF1

**Flight plan notes:** Executed similar plan as RF070, but was changed during flight to add the waypoint of YAALE on the return route to better align with low alt clouds.

**Approx. takeoff:** 13:15 EST

**Approx. landing:** 16:34 EST

**QNC(s):** Shane Seaman was the operator for HSRL-2, RSP, drop sondes, and the cameras.

**Sondes:** A total of 4 sondes were dropped. One on the outbound leg at ZIBUT, one on the turn-around point at STOOG, one near YAALE (with cloud), and one near the coast on the way back.

**RSP:** nominal operation, no notes.

**HSRL:** nominal operation, miscommunication between pilots and QNC resulted in FOD remaining shut some time after we reached safe lasing altitude, so some loss of HSRL data early in the flight.

**Cameras:** nominal operation, nadir camera did not have video until FOD was opened some time after 18kft.

### **Falcon**

Pilot report (Baxley): Science flight for the HU-25 in support of ACTIVATE, conducted cooperatively with the UC-12. Departed Rwy08 to ATLIC climbing to 4k ft MSL for initial transit. Research profiles conducted from ATLIC-ZIBUT-STOOG-ZIBUT-ATLIC, from 500' to 5500' MSL. Winds were moderate (<20 knots), with clear air until east of ZIBUT and then a scattered layer from 2500' – 5000' MSL between ZIBUT and the eastern most point. Both cloud and clear air modules were completed throughout the flight as conditions warranted. The return leg was modified in flight by adding the waypoint YAALE between STOOG and ZIBUT. Aircraft geolocation was within ~20 nmi throughout the flight, and generally within ~10 nmi during the return westbound leg. All objectives were achieved and no system discrepancies were noted.

Pilots: Slover/Baxley

QNCs: Crosbie/Winstead

Time (L): 1320 takeoff, 1645 land, 3.4 hrs

Flight Number: 21-063

Flight scientist report (Crosbie): This flight was launched with modified turnpoints to divert attention to the cold water environment and the stratus cloud. The same comments apply to this flight regarding MIN and IMC. There was a case when 1000 was ACT and so a profile was included to 3600ft to investigate NPF aloft. The stratus cloud was interspersed with regions of clear which enabled near surface sampling to resume to complement the in cloud data nearby. In some cases it appeared as the cloud was interacting with the surface as fog. The shallow MBL allowed very rapid completion of the

modules, hence a large number of modules were repeated. Like the earlier flight, a high number of cloud water samples (10) were collected in this flight owing to the large duration in cloud. (6 full cloudy, 1 clear)

Notes from Eddie:

Before 2<sup>nd</sup> flight heaters were turned off too try to help with aircraft cooling down before flight

17:27:15 – Both nephs zeroed

17:49 – Humidifier requiring a lot on manual adjustment; Controller recycled to see if that will improve automatic control

18:00:38 – Hot CPC counts decreased as scattering increased; Scattering decreased from 20 to 2

18:05:30 - Scattering increased and hot CPC counts also

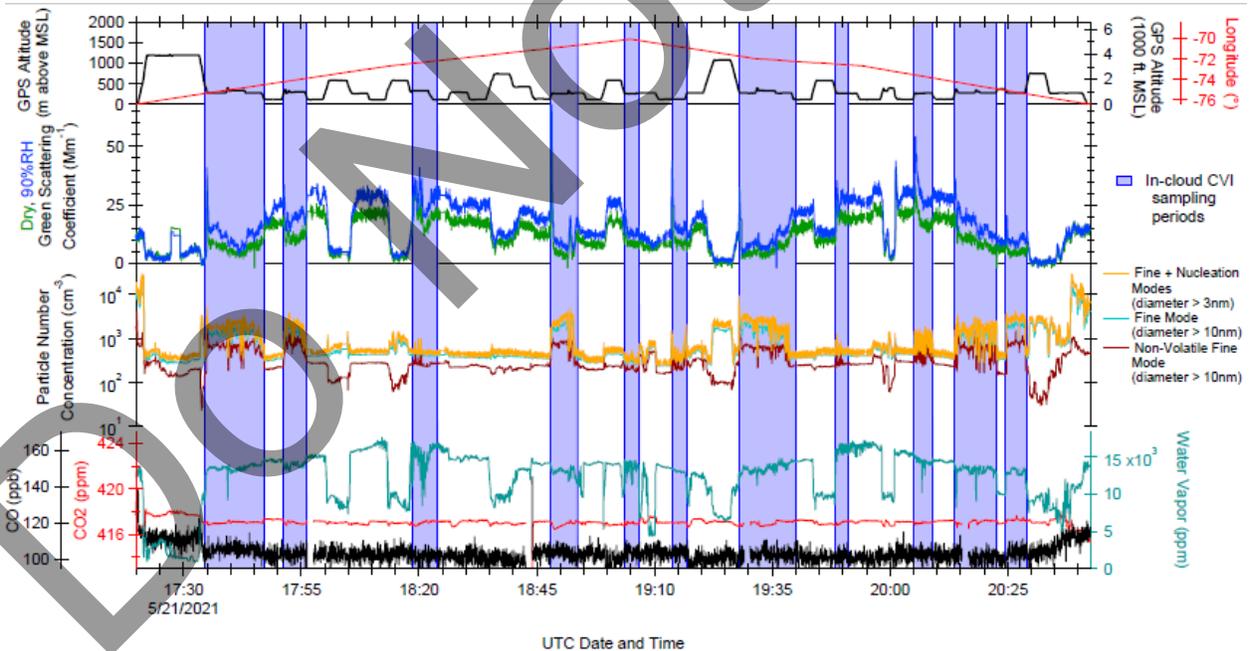
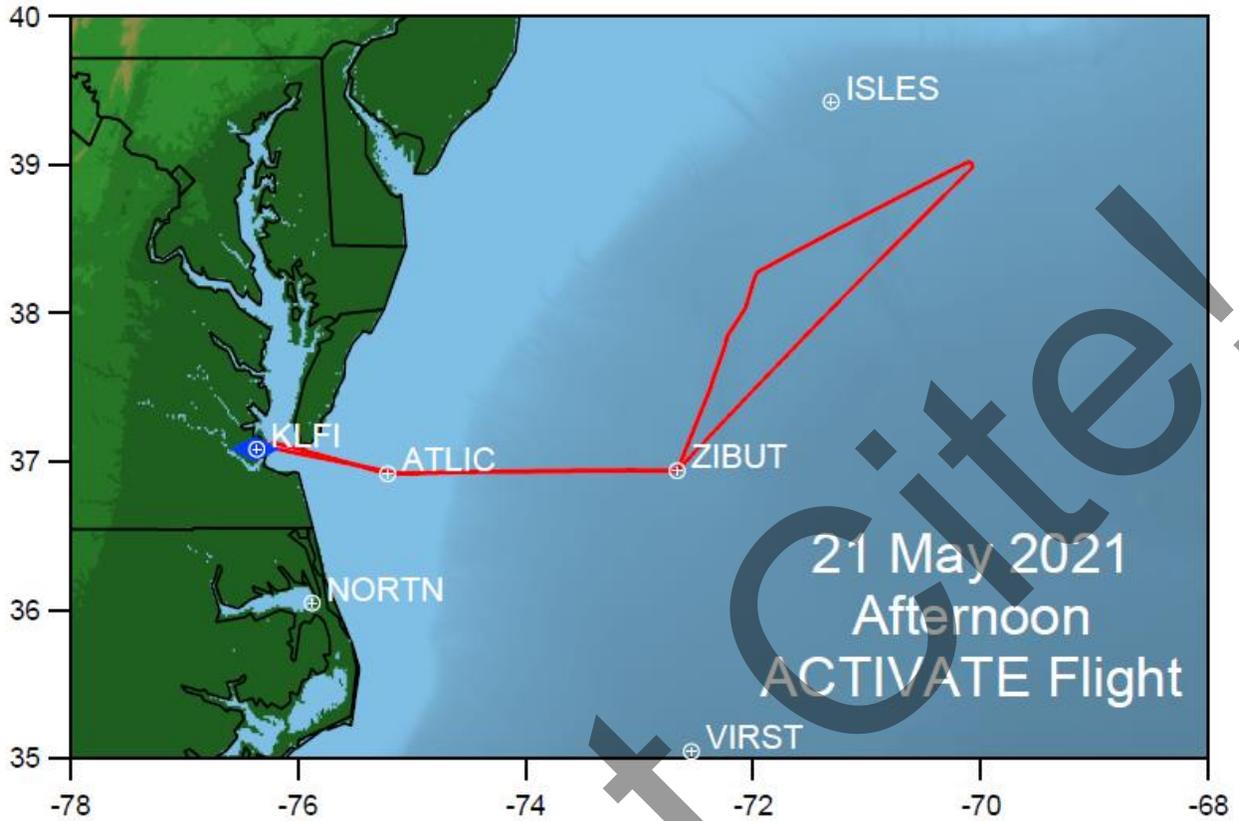
18:11 - SMPS software had locked up and stopped responding. After multiple attempts to restart software, it was successfully restarted and SMPS scanning resumed.

18:15 - SMPS mode around 15 nm; LAS conc low but mode around 150 nm; @ 2000 ft

19:23:30 - SMPS mode around 15 nm @ 3600 ft; cloud tops around 900 ft

19:41:30 - LAS mode ~180 nm @ 500 ft

20:38 – Humidifier & WCM turned off prior to landing



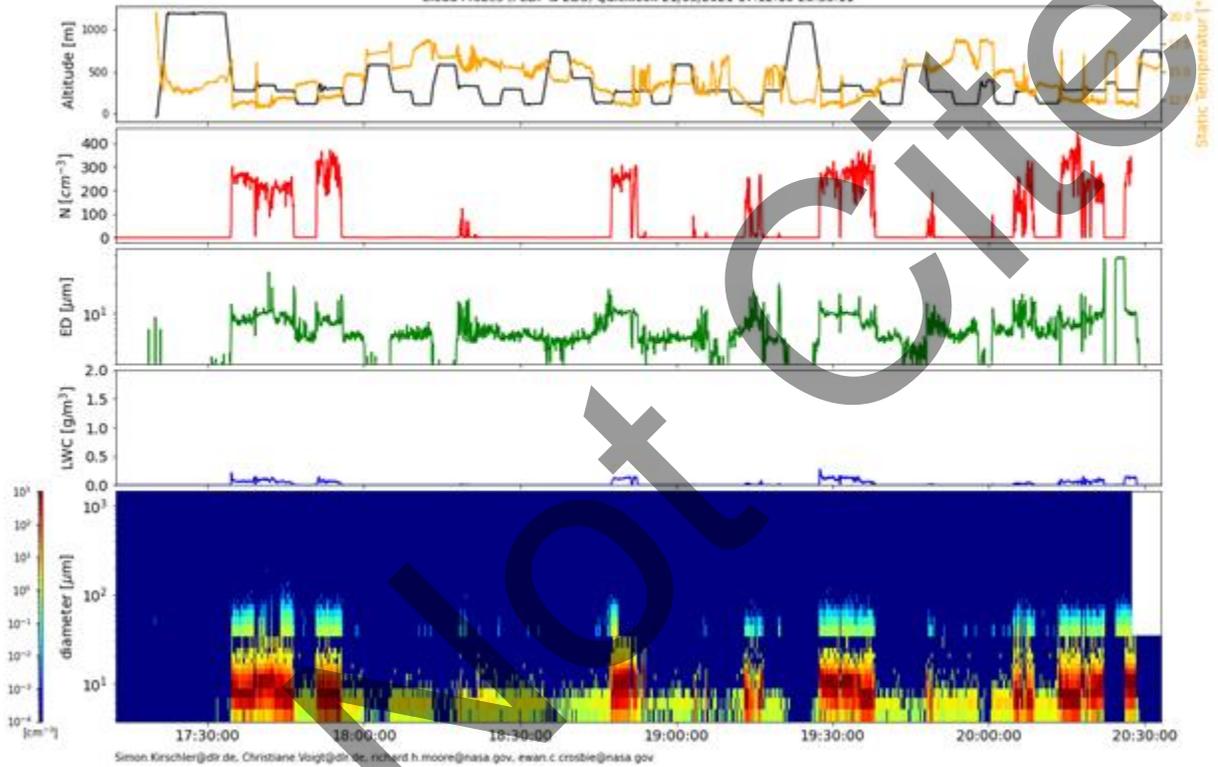
# Quicklook ACTIVATE Cloud Probes (FCDP & 2DS) Quicklook

preliminary data, only for quicklook use

Simon Kirschler, Christiane Voigt, Richard Moore, Ewan Crosbie

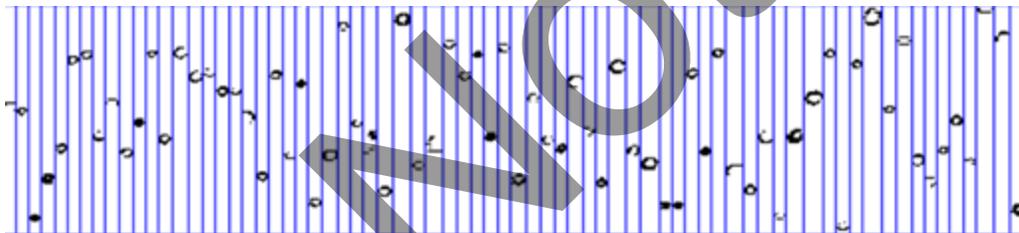
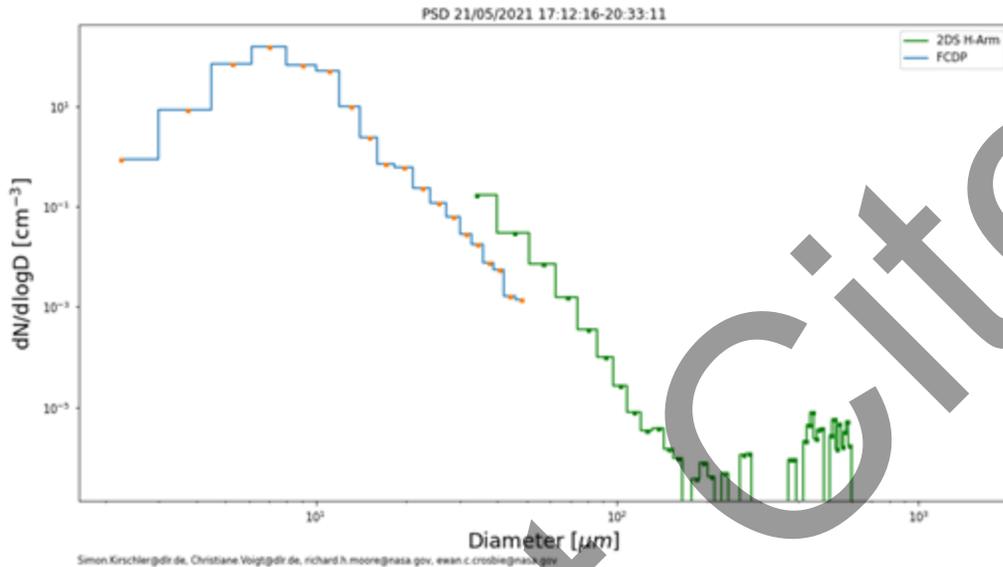


Cloud Probes (FCDP & 2DS) Quicklook 21/05/2021 17:12-16:20:33:11



# PSD ACTIVATE

preliminary data, only for quicklook use  
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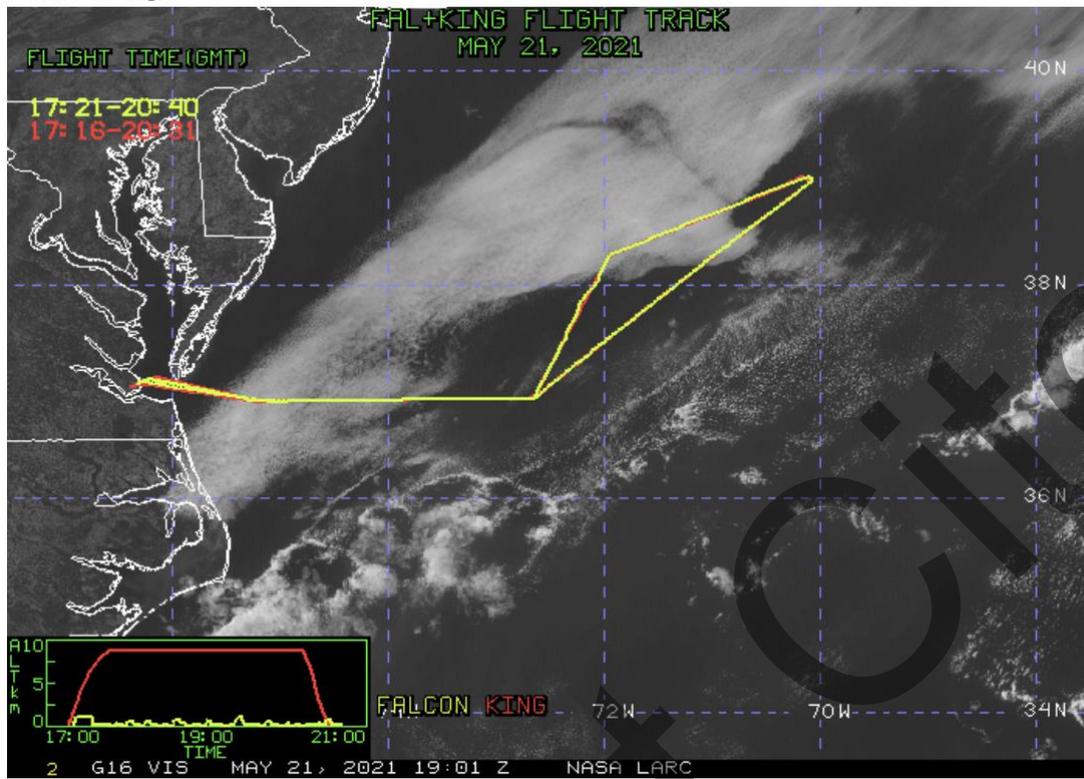


Only pure liquid clouds with only drizzle.

NASA-LaRC Clouds Group GOES-16 Quicklook Images for Flight 71, 19:01 UTC May 21, 2021

Do Not Cite!

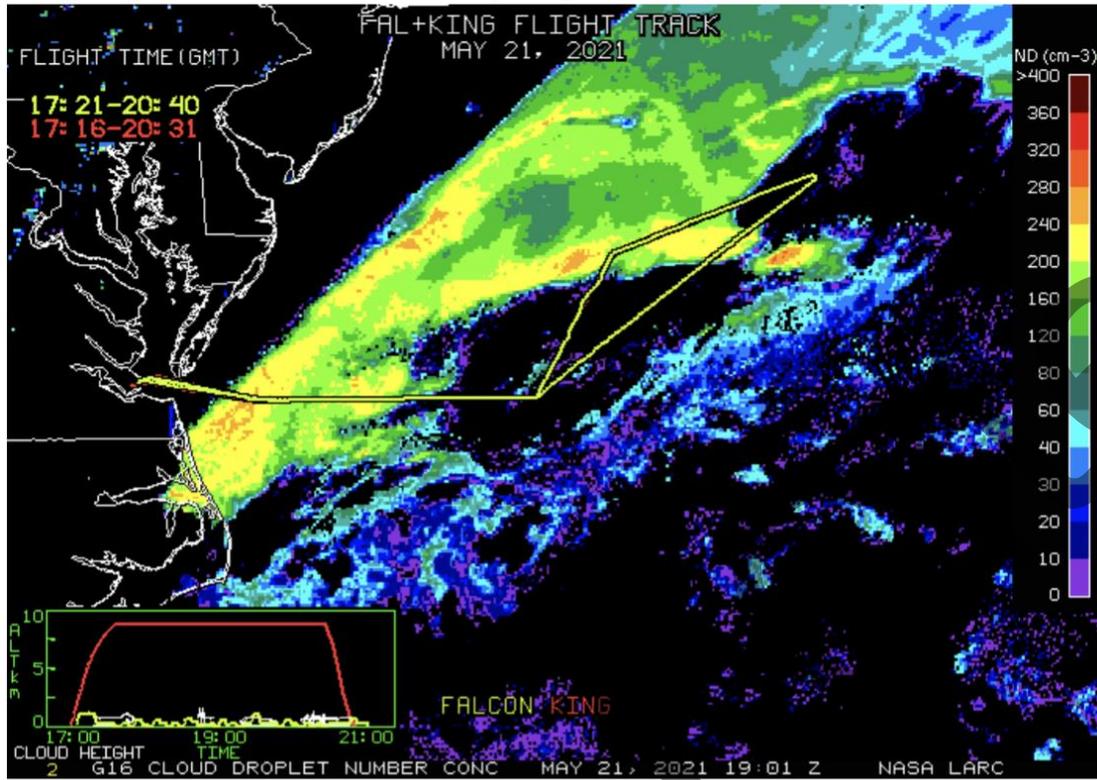
### Visible Image



### Cloud Phase



Cloud Droplet Number Concentration (cm-3)



Cloud-Top Height (Kft-ASL)

